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## Space Weather Forecast

Issued on Tuesday, 06 September 2022 at 01:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

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**Space Weather Forecast Headline: Chance of R1/R2 Radio Blackouts. Chance of G1/G2 Minor/Moderate Geomagnetic Storms day 1 (6th).**

### Analysis of Space Weather Activity over past 24 hours

**Solar Activity:** Solar activity was Moderate with one Moderate class flare observed at 05/1805 UTC, originating from AR3089. There are now seven sunspot regions on the visible disc. The largest and most complex remains AR3089, which is currently traversing the southwestern limb. The remaining sunspots are all small and simple. There have been no Earth directed coronal mass ejections seen in satellite imagery over the last 24 hours, although there is a diminishing chance of a glancing blow early in the forecast from a coronal mass ejection launched on 2nd September, this is now over 12 hours later than originally expected.

**Solar Wind / Geomagnetic Activity:** The solar wind was indicative of a waning high speed stream, thought to be from coronal hole 20. The wind speed declined from Strong to Elevated. Total interplanetary magnetic field strength was weak. The north-south component was largely negative. Geomagnetic activity varied between Active (Kp4) and G1/Minor storm (Kp5) intervals.

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is at background levels, with no solar radiation storms occurring.

### Four-Day Space Weather Forecast Summary

**Solar Activity:** Solar activity is expected to be largely Low, with a chance of becoming Moderate. AR3089 will likely exert influence on the flare risk due to its location until the end of day 2 (7th). New regions are currently appearing on the east limb, though analysis is currently difficult due to foreshortening, these may have an influence on the flare risk if they appear to be complex regions.

**Solar Wind / Geomagnetic Activity:** There is a diminishing chance of a glancing blow early in the forecast from a coronal mass ejection launched on 2nd September, this feature is now over 12 hours late. No other Earth-directed coronal mass ejections are expected. Solar winds will initially be elevated due to the high speed stream of coronal hole 20, gradually easing to slightly elevated by day 2 (7th). There is a risk of a high speed stream arriving from a faint coronal hole, currently near north centre disk late on day 1 or early day 2 (6th or 7th) perhaps enhancing winds speeds once again to elevated, though confidence on this is much lower than average. Wind speeds should then revert back to slightly elevated or background by day 3 or 4 (8th or 9th). Geomagnetic activity will likely be Unsettled to Active, with a chance of G1/Minor Storm intervals on day 1 (6th) and perhaps early on day 2 (7th). Baseline Geomagnetic activity should become Quiet to Unsettled by day 3 (7th) onward.

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is likely to remain below the Minor Radiation Storm level (S1). There remains a very slight chance of further increases to or above the S1 level, should any significant flares occur from the large sunspot region around the southwest limb until the end of day 2 (7th).

## Geomagnetic Storms:

| Geo-Magnetic Storm          | Level    | Past 24 Hours<br>(Yes/No) | Day 1<br>(00-24 UTC) | Day 2<br>(00-24 UTC) | Day 3<br>(00-24 UTC) | Day 4<br>(00-24 UTC) |
|-----------------------------|----------|---------------------------|----------------------|----------------------|----------------------|----------------------|
| Probability<br>(Exceedance) |          |                           | (%)                  | (%)                  | (%)                  | (%)                  |
| Minor or Moderate           | G1 to G2 | Yes                       | 40                   | 20                   | 5                    | 1                    |
| Strong                      | G3       | No                        | 2                    | 1                    | 1                    | 1                    |
| Severe                      | G4       | No                        | 1                    | 1                    | 1                    | 1                    |
| Extreme                     | G5       | No                        | 1                    | 1                    | 1                    | 1                    |

## Radio Blackouts - X Ray Flares:

| X Ray Flares | Level            | Past 24 Hours<br>(Yes/No) | Day 1<br>(00-24 UTC) | Day 2<br>(00-24 UTC) | Day 3<br>(00-24 UTC) | Day 4<br>(00-24 UTC) |
|--------------|------------------|---------------------------|----------------------|----------------------|----------------------|----------------------|
| Probability  |                  |                           | (%)                  | (%)                  | (%)                  | (%)                  |
| Active       | R1-R2<br>M Class | No                        | 40                   | 40                   | 20                   | 20                   |
| Very Active  | R3 to R5<br>X    | No                        | 5                    | 5                    | 2                    | 2                    |

## Solar Radiation Storms - (High Energy Protons):

| Radiation Storms            | Level<br>(cm <sup>-2</sup> sr <sup>-1</sup> s <sup>-1</sup> ) | Past 24 Hours<br>(Yes/No) | Day 1<br>(00-24 UTC) | Day 2<br>(00-24 UTC) | Day 3<br>(00-24 UTC) | Day 4<br>(00-24 UTC) |
|-----------------------------|---------------------------------------------------------------|---------------------------|----------------------|----------------------|----------------------|----------------------|
| Probability<br>(Exceedance) |                                                               |                           | (%)                  | (%)                  | (%)                  | (%)                  |
| Active                      | ≥ S1                                                          | No                        | 5                    | 5                    | 1                    | 1                    |
| Very Active                 | ≥ S3 *                                                        | No                        | 1                    | 1                    | 1                    | 1                    |

\* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm<sup>-2</sup>sr<sup>-1</sup>s<sup>-1</sup>)